

An oat-pea intercrop may be planted as a grain crop and local evaluation of seeding rates is needed to assess crop value, agronomic characteristics, and flexibility for end use. A combination of pea and oat may have higher Land Equivalency Ratio (LER) and crop value than either monocrop on their own. Also, grain intercrops may improve the agronomic characteristics of pea by reducing or mitigating lodging, disease, and insect damage. This project investigated the effect of varying the oat seeding rate as a companion crop with pea to determine whether there is a consistent optimum balance of the two crops. This trial was conducted at Redvers, Melfort, Indian Head, Swift Current, Outlook, and Prince Albert in 2019. The treatment list is shown in Table 1.

Table 1. Treatment list for oat-pea intercrop demonstration.

Trt #	Crop	Oat Seed Rate (plants meter ⁻²)	Oat Seed Rate (approx. lb/ac)	Pea Seed Rate (plants meter ⁻²)
1	Pea + Oat	25	11	80
2	Pea + Oat	50	21	80
3	Pea + Oat	75	32	80
4	Pea + Oat	100	43	80
5	Pea + Oat	125	53	80
6	Oat	200	85	0
7	Pea (hand-weeded)	0	0	80
8	Pea	0	0	80

Land Equivalency Ratio for grain yield was close to one at Indian Head, Outlook, and Swift Current and was lower than one at Redvers. Biomass LER tended to be close to one with small effects of oat seeding rate on that ratio. The site at Indian Head was the most successful for intercrop establishment. The irrigated site at Outlook had the highest yields but poor establishment and growth of the peas. At Redvers, bird damage and possibly dry conditions resulted in lower LER. There were some indications that intercropping reduced lodging and improved weed competition. Oat quality was determined for the seed samples collected at Indian Head and Redvers. Samples from Indian Head showed bushel weights of 39.4 for intercrop treatments vs 37.42 for the monocrop oats. Redvers samples did not show the same trends but had high unthreshed grain percentage for some reason, possibly high moisture at combining or

incorrect combine setting. Estimated cost of basic separation using rotary screens based on \$0.25/bu (industry source) was \$15-25/ac depending on yield. In this demonstration, about half the normal rate of N was applied to the intercrops, resulting in a cost savings of about \$18/ac compared to monocrop oats. The cost of pea seeds was estimated at \$22/ac and ranged from \$1 to \$5 per acre for oat seeds. The costs of intercrop relative to monocrop oats are shown in Table 2.

There were some promising indications for oat quality and weed suppression, but there was no indication of a yield advantage to intercropping pea and oat. With the separation costs included, production of yellow peas and milling oats was not attractive compared to the monocrops from a profitability standpoint. This trial did not determine whether there are any reductions in pesticide use possible which might offset the separation costs of the pea and oats. These results suggest there is potential for intercropping to improve competitive ability of pea, particularly at the higher rates of oat inclusion (75, 100, 125 oat plants/m²) as well as

reduce lodging relative to the pea monocrop. This intercrop shows some positive functionality, but separation costs and lack of broad-spectrum suitable herbicides would be an obstacle to adoption.

Table 2. Costs of intercrop relative to monocrop oats.

	Intercrop
Seed cost	\$9 higher
N fertilizer	\$17.50 lower
Separation	\$18 higher
Pesticides	Unknown differences
Total	\$9.5 higher (minus differential in pesticide use)

Funding for this project was provided by Sask Oats and Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward 2 bi-lateral agreement.